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Regulatory Conditions for Bankability of Renewable Energy Projects in the Caucasian Region

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RE Potential in Armenia

- **Hydropower**: Economically justified potential: 3.6 TWh out of which about 42% is developed. During the next 15 years three new major HPPs will be constructed and small HPPs potential utilized
- **Wind Energy**: Economically justified potential: 450 MW. The first wind power plant put in operation in 2005
- **Solar Energy**: Average annual amount of solar energy: about 1,720 kWh/m^2)
- **Geothermal Energy**: According to investigations at Jermaghbyur high pressure (20-25 atmosphere) hot water (up to 250^o C) are considered to be available in depth of 2,500-3,000 m. If this data is confirmed, it will be possible to construct the geothermal power plant with 25MW capacity
- **Biomass**: is not widely used as a power or gas source. Annual potential of biogas is about 135 million m3

RE Potential in Azerbaijan

- **Hydropower**: Estimated total potential: 40 TWh, out of which 5 TWh of small hydropower. Currently only 12.5% of the total electric energy is produced from hydro
- **Wind energy**: Total economic potential: 500 MW. Currently 2 wind power stations are operational and connected to the grid, 16 are under construction
- **Solar energy**: High potential due to the favorable climatic conditions
- **Geothermal energy**: Production capacity of Lenkoran, Massaly, and Astara regions: about 25,000 m^3 of 40℃ geothermal water daily
- **Biomass (biogas):** above 2 million cattle and over 20 million heads of chicken offer good technical potential for biogas

RE Potential in Georgia

Hydropower

- There are 26,000 rivers on the territory of the country out of which about 300 rivers are significant in terms of power generation;
- Technically feasible potential: 80 TWh/a
- Economically feasible potential: 30-50 TWh/a according to different authors
- Considering export opportunities after commissioning of transmission line to Turkey it can be assumed that the ratio of economically feasible potential will be increased. Actually, only small part of the country’s hydropower potential is utilized (15-25%).

RE Potential in Georgia

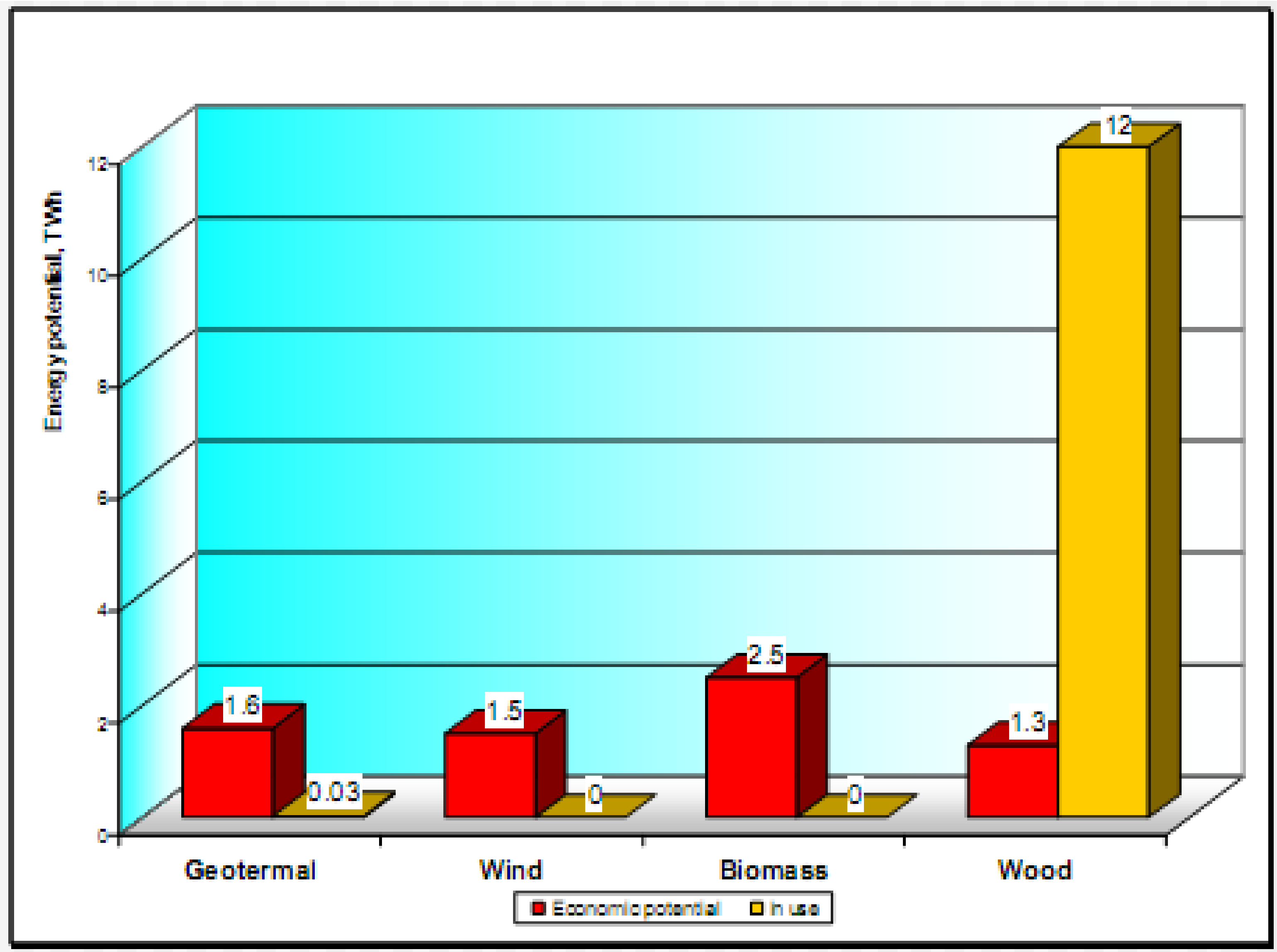
Hydropower (continuation)

- List of the potential small and medium HPPs include 43 sites with a total capacity 413 MW (capacities of individual HPPs in a range 1-44 MW)
- Memorandum of Understanding (MoU) between the Government of Georgia (GoG), Electricity System Commercial Operator (ESCO) and investment Company signed for 40 HPPs including 39 plants in a range 2-125 MW and 700 MW Khudoni HPP; Total capacity 1,872 MW, total annual generation 7,391 GWh
- Out of this list 15 projects are under the implementation

RE Potential in Georgia

- Wind Energy: Estimated potential: 4,000 GWh/a
- In 2007 the MOU was signed between the GoG and the investor on construction of 24 MW wind plant in the suburbs of Tbilisi Sea
- Geothermal Energy: Total resources: 250 million m^3 of 30^0C-110^0C geothermal water annually; More than 250 natural and drilled.
- Practical utilization of geothermal resources in Georgia started in 1973; In 1988, the total supply reached 22 million m^3/a; Last wells drilled in the beginning of 1990's
- Nowadays geothermal systems are destroyed in Western Georgia, where the major geothermal sources are located. In Saburtalo district of Tbilisi geothermal hot water supply system is still functioning, however, with very low efficiency

RE Potential in Georgia

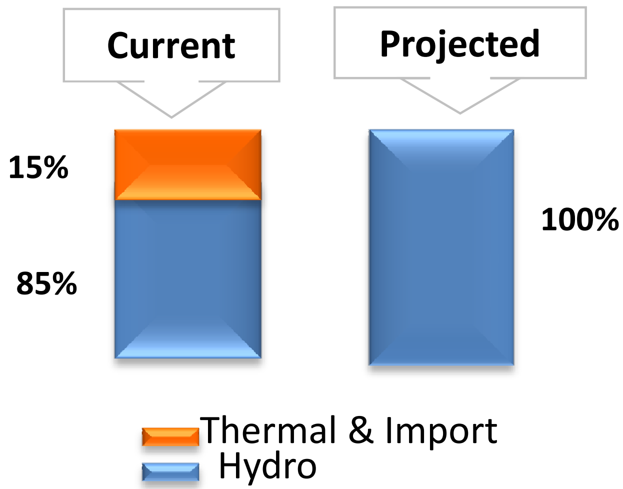


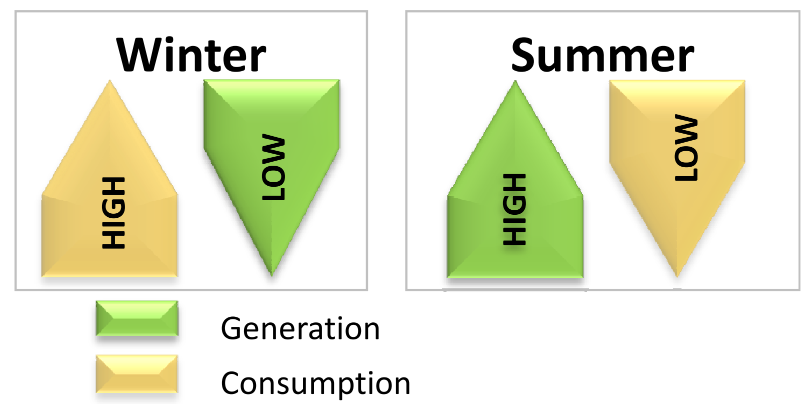
Power Markets in Caucasian Region

- The energy markets of 3 countries are different.

  In Georgia and Armenia they are mostly based on the market principles while in Azerbaijan generating facilities are state-owned
- Sector regulatory mechanisms are also different. In Armenia feed-in-tariff (USD 5.282 USD/MWH excluding VAT) and 15-year guaranteed purchase of generated energy is available to the IPPs
- In Georgia SHPPs and HPPs built after August 1, 2008, have been fully deregulated.
- In Azerbaijan fixed tariff level is established for RE (about 45 EUR/MWh).

Electricity Balance of Georgia





TW/h	2004	2005	2006	2007	2008	2009	2010	2011
Generation	6.9	7.1	7.6	8.3	8.6	8.9	10.1	10.1
Hydro	6.0	6.0	5.4	6.9	7.3	7.7	9.3	7.9
Thermal	0.9	1.0	2.2	1.5	1.3	1.2	0.8	2.2
Net Export	**-1.2**	**-1.3**	**-0.7**	**0.2**	**0.3**	**0.5**	**1.3**	**0.5**
Consumption	8.1	8.3	8.3	8.1	8.3	7.9	8.8	9.6
Distribution	5.7	5.9	5.9	5.9	6.0	5.9	6.4	7.4
Direct Customers	1.7	1.9	2.0	2.0	2.1	1.7	2.1	1.8
Transmission Losses	0.7	0.5	0.4	0.2	0.2	0.3	0.3	0.4

Current Regulatory Conditions for RE in Georgia

- Deregulated market for new HPPs
- Deregulated SHPPs
- State land with normative price
- Free third-party access to the grid
- No export license
- Long term PPA with ESCO
- “Cross Border Trade Agreement” with Turkey

Improved Environment for RE Development in Georgia

- GoG's strong support and commitment aimed at developing hydropower resources
- “State Program on Renewable Energy 2008” foresees construction of HPP with the principle of BOO “Build, Operate and Own”. This means that the investor after building HPP is the fully authorized owner with no time limit
- Liberal Tax Legislation (Only 6 taxes effective; Low and flat tax rates; Internationally accepted methods and practices; Light administrative burden to taxpayers)

Improved Environment for RE Development in Georgia

- **<u>Simplified Procedures for permitting and licensing process.</u>**

  At present there are only 4 permits and licenses necessary for construction and start up of new RE power plants (hydro, wind):

Permit / License /	Issuing Institution
A land lease or purchase agreement	A Local self-government body
The permit of using and discharging water	The Ministry of Energy and Natural resources
The Construction Permit	The Ministry of Economy and Sustainable Development
The Power Generation License*	The Regulatory Commission

*** HPPs with less than 13 MW do not require Generation License**

POWER Export Opportunities in Georgia

- Construction of new high voltage 500/400 KV line to Turkey will be finished in 2012
- Construction of additional interconnection with Turkey is under negotiation
- By 2013 Turkey is expected to be a net importer of electricity
- The peak demand season (summer) in many of neighboring countries occurs in Georgia’s peak supply season

Necessity in Further Improvement of Regulatory Conditions for RE in Georgia

- Approval of Renewable Energy Law that among others would include incentives for green energy producers (e.g. introduction of feed-in-tariff)
- Deregulated power generating facilities have to sell electricity to ESCO during the winter months. In other months they can sell electricity to either ESCO or Distribution or Direct consumer or Export.
- Out of them only ESCO is obliged to buy electricity at the guaranteed tariff for 3 winter months for 10 years. However, the value of guaranteed tariff is not determined (has to be negotiated)

Priorities aiming at attracting investments

	Azerbaijan	Armenia	Georgia
Hydropower			
Simplification of procedures	Partially	Partially	Yes
Incentives for RE	No	Feed-in Tariff; 15-year guarantee	No
IFI financing	In principle available; few actual practices	Yes	In principle available; few actual practices
Local Banks' financing	In principle available; lack of actual experience in financing RE	In principle available; few actual practices	Available in spite of limited experience in financing RE
Suggestion: Regional Programme of Activities (PoA) for Small Hydropower			

Thank you for your attention

Lunch will now be served in the Filini restaurant and terrace.